

C L A I M S

1. A CVD method for forming a silicon nitride film on a target substrate, the method comprising:

heating the substrate accommodated in a process container, at a process temperature; and

supplying a process gas including hexaethylamino-disilane gas and ammonia gas onto the substrate heated at the process temperature, thereby depositing a silicon nitride film on the substrate.

2. The method according to claim 1, wherein the process temperature is set to be within a range of from 400 to 600°C.

3. The method according to claim 1, wherein a ratio of a flow rate of the ammonia gas relative to a flow rate of the hexaethylaminodisilane gas is set to be within a range of from 30 to 200.

4. The method according to claim 1, wherein depositing the silicon nitride film comprises supplying the process gas into the process container while exhausting the process container, thereby setting the process container to have a process pressure of from 27 to 1333 Pa.

5. The method according to claim 1, wherein the process container is configured to accommodate a plurality of target substrate at intervals in a vertical direction, and the target substrates is heated by a heater disposed around the process container.

6. A CVD method for forming a silicon nitride film on a target substrate, the method comprising:

heating the substrate accommodated in a process container, at a process temperature; and

5 alternately supplying a first process gas including hexaethylaminodisilane gas and a second process gas including ammonia gas in cycles onto the substrate heated at the process temperature, thereby depositing a silicon nitride film on the substrate, 10 wherein supplying the second process gas comprises turning the second process gas into plasma for excitation.

7. The method according to claim 6, wherein each cycle is arranged to supply the first process gas for 1 15 to 60 seconds, and to supply the second process gas for 1 to 60 seconds.

8. The method according to claim 6, wherein supply rates and supply periods of the first and second process gases in each cycle are set such that, when the 20 first and second process gases are supplied once for each, a silicon nitride film thereby formed preferably has a deposition thickness of from 0.05 to 0.5 nm.

9. The method according to claim 6, further comprising purging of the process container between 25 supply of the first process gas and supply of the second process gas, wherein the purging of the process container comprises exhausting the process container

while stopping the first and second process gases.

10. The method according to claim 6, wherein the process temperature is set to be within a range of from 300 to 600°C.

5 11. The method according to claim 6, wherein a ratio of a flow rate of the ammonia gas relative to a flow rate of the hexaethylaminodisilane gas is set to be within a range of from 30 to 200.

10 12. The method according to claim 6, wherein the second process gas is excited while passing through a plasma generating area, which is disposed in a space communicating with the process container and between a supply port of the second process gas and the substrate.

15 13. The method according to claim 12, wherein the process container is provided with an electrode and an RF power supply, and the plasma generating area comprises an RF electric field formed between the supply port of the second process gas and the substrate
20 by the electrode and the RF power supply.

14. The method according to claim 13, wherein the process container is configured to accommodate a plurality of target substrate at intervals in a vertical direction, and the target substrates is heated
25 by a heater disposed around the process container.

15. The method according to claim 14, wherein the first and second process gases are supplied from

a plurality of first gas spouting holes and a plurality of second gas spouting holes, respectively, to form gas flows parallel with the target substrates, and each group of the first gas spouting holes and the second gas spouting holes are arrayed over the target substrates in a vertical direction.